IDENTIFYING SKYLINES IN CLOUD DATABASES WITH INCOMPLETE DATA

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Abstract

Skyline queries is a rich area of research in the database community. Due to its great benefits, it has been integrated into many database applications including but not limited to personalized recommendation, multi-objective, decision support and decision-making systems. Many variations of skyline technique have been proposed in the literature addressing the issue of handling skyline queries in incomplete database. Nevertheless, these solutions are designed to fit with centralized incomplete database (single access). However, in many real-world database systems, this might not be the case, particularly for a database with a large amount of incomplete data distributed over various remote locations such as cloud databases. It is inadequate to directly apply skyline solutions designed for the centralized incomplete database to work on cloud due to the prohibitive cost. Thus, this paper introduces a new approach called Incomplete-data Cloud Skylines (ICS) aiming at processing skyline queries in cloud databases with incomplete data. This approach emphasizes on reducing the amount of data transfer and domination tests during skyline process. It incorporates sorting technique that assists in arranging the data items in a way where dominating data items will be placed at the top of the list helping in eliminate dominated data items. Besides, ICS also employs a filtering technique to prune the dominated data items before applying skyline technique. It comprises a technique named local skyline joiner that helps in reducing the amount of data transfer between datacenters when deriving the final skylines. It limit the amount of data items to be transferred to only those local skylines of each relation. A comprehensive experiment have been performed on both synthetic and real-life datasets, which demonstrate the effectiveness and versatility of our approach in comparison to the current existing approaches. We argue that our approach is practical and can be adopted in many contemporary cloud database systems with incomplete data to process skyline queries.

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